Rebuttal Report of the United States Environmental Protection Agency Regarding the Comprehensive Cleanup Approach for the Coeur d'Alene Basin

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I. Introduction

The United States Environmental Protection Agency (EPA) spent more than four years, from 1998 through 2002, investigating the extensive environmental problems in the Coeur d'Alene Basin (Basin) and developing a remedial approach to address them. EPA worked with several federal agencies, two tribes, two states, four counties, several local governments, and hundreds of interested citizens. More than 17,000 samples[1] of soil, sediment, groundwater, surface water, and other media were evaluated to assist in understanding the widespread contamination of the Basin and how it has impacted human health and the environment. EPA evaluated a range of alternatives in order to develop an approach that would meet the requirements for cleanup actions under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

As part of this process, EPA evaluated in detail the cleanup approach now resurrected by ASARCO (ASARCO Alternative) in LECG's Report of June 15 2007. EPA determined that the ASARCO Alternative was unacceptable and rejected it. It is still unacceptable. The ASARCO Alternative does not meet the statutory requirement that a remedy must be protective of human health. It does not meet the requirement that a remedy must be protective of the environment. It does not address the requirement that a remedy must comply with Applicable or Relevant and Appropriate Requirements (ARARs). It is ineffective compared to EPA's selected Interim Remedy from the 2002 ROD and the Comprehensive Remedy.[2] It fails to address most of the serious problems caused by ASARCO's disposal of mine waste into the Basin.

Remarkably, even though the ASARCO Alternative does not meet the statutory and regulatory requirements of CERCLA, LECG asserts that the ASARCO Alternative is acceptable because it is consistent with the recommendations of the National Research Council of the National Academies (NRC) in its review of EPA's Interim Remedy. In fact, the ASARCO Alternative ignores crucial concerns raised by the NRC. The ASARCO Alternative does not address most sources of contamination within the Basin nor does it address groundwater contamination. It does not provide for repositories for disposal of contamination. It does not incorporate adaptive management into remedy implementation. Furthermore, it fails to realistically address the need for additional cleanup actions beyond the limited, predominantly stabilization actions proposed by ASARCO. In contrast, the EPA Comprehensive Remedy does address the concerns of the NRC.

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[1] During the Remedial Investigation/Feasibility Study (RI/FS), EPA used historical sample data, as well as obtaining new samples collected for the RI/FS. More than 7,000 historical data points had been collected from various state and federal agencies in the Basin. In addition to this historical data, EPA collected an additional 10,000 samples of soil, sediment, groundwater, surface water, drinking water, paint, and house dust.

[2] The Comprehensive Remedy is comprised of the Ecological Alternative 3 developed in the Basin RI/FS and the Human Health Alternative that was selected in the 2002 ROD. The Comprehensive Remedy was the subject of my June 15 2007 report.

For some reason, LECG has chosen to compare the ASARCO Alternative to the 2002 Interim Remedy instead of the Comprehensive Remedy in its report. It is important to keep in mind the difference between EPA's Comprehensive Remedy and the 2002 Interim Remedy. As discussed in my June 15 2007 report, the Comprehensive Remedy represents EPA's long term cleanup plan for the Basin. The Interim Remedy is only the first phase of cleanup and is a prioritized subset of cleanup actions from the Comprehensive Remedy. Thus, the Comprehensive Remedy is the appropriate basis for evaluating the cost of long-term cleanup in the Basin.

II. Statutory and Regulatory Requirements

The alternative remedy approach put forward by ASARCO in LECG's report was not developed in accordance with CERCLA, nor did it consider the requirements of the implementing regulations of the National Contingency Plan[3] (NCP). Rather, the ASARCO Alternative was based on a report submitted by Mr. Werner as part of the Phase I trial in the Coeur d'Alene Litigation. This report was updated in 2004 but the technical proposal was not significantly changed (Werner 1999, 2004). These reports do not include the required analysis of a remedy under CERCLA.

During the Basin RI/FS, EPA asked the mining companies in the Basin, which included ASARCO, to participate. The mining companies declined to participate in the RI/FS. Therefore, EPA used the proposed cleanup approach and cost estimate in Mr. Werner's litigation report to develop a cleanup alternative to represent the mining companies' proposal. By doing this, EPA was able to evaluate Mr. Werner's alternative during the remedy evaluation and selection process of the RI/FS.

In evaluating Mr. Werner's alternative, which is the basis of the ASARCO Alternative, along with the other alternatives developed through the RI/FS against the statutory and regulatory requirements, EPA determined that the Comprehensive Remedy was the best balance of all cleanup alternatives. When Mr. Werner's alternative was evaluated, it ranked second lowest. Only the No Action cleanup alternative ranked lower (ROD 2002). Thus, EPA has already evaluated and rejected the cleanup plan reflected in the ASARCO Alternative.

The fundamental flaw in the ASARCO Alternative is that it fails to meet the legal requirements for remedy selection. Congress enacted CERCLA to enable EPA to identify and cleanup the nation's most hazardous sites. The NCP requires EPA to conduct a Remedial Investigation/Feasibility Study (RI/FS), develop remedial alternatives, and select a remedy that will address the site contamination. Once all the alternatives are developed, EPA is required to evaluate the cleanup alternatives against nine criteria: (1) protection of human health and the environment; (2) compliance with applicable or relevant and appropriate requirements (ARARs); (3) implementability; (4) long-term effectiveness; (5) short-term effectiveness; (6) reduction of toxicity, mobility, and volume through treatment; (7) cost; (8) State/Tribal acceptance; and (9) community acceptance. These nine criteria are broken down into threshold criteria (protection of

[3] 40 C.F.R. 300

human health and the environment, compliance with ARARs), balancing criteria (implementability; long-term effectiveness; short-term effectiveness; reduction of toxicity, mobility, and volume through treatment; and cost) and modifying criteria (State/Tribal acceptance and community acceptance).[4] Using the nine selection criteria, a comparative analysis is performed for the cleanup alternatives to determine which remedy represents the best balance of tradeoffs. The NCP requires that EPA select a remedy that meets the threshold criteria--protection of human health and the environment and compliance with ARARs[5], unless ARARs are waived under specified conditions.

In their report, LECG misinterprets the remedy selection process under the NCP. They use the evalution criteria selectively in presenting the ASARCO Alternative. They fail to provide any analysis of the threshold criteria--protection of human health and the environment and compliance with ARARs--which are essential requirements for remedy selection.

The failure to consider the threshold criteria is particularly noteworthy in the case of ARAR analysis. As discussed in my June 15 2007 report, the applicable or relevant and appropriate requirements are those federal, state, and tribal environmental statutes, regulations, and other requirements that pertain to a site. One of the most important components of remedy selection involves identifying ARARs for a site and determining how well the alternatives are expected to achieve them. Therefore, one of the critical deficiencies of the ASARCO Alternative is that there is no identification of ARARs and no ARAR analysis. LECG ignores the significance of ARAR analysis when they suggest that EPA could simply waive ARARs at the site and select cleanup goals that are less stringent than those in the Interim ROD.

EPA does have authority to waive ARARs under limited, specified circumstances. At this point, there is no technical basis to invoke an ARAR waiver. Moreover, the ASARCO Alternative makes no attempt to develop the technical analysis to support an ARAR waiver. Furthermore, ARARs can only be waived if the remedy will still be protective of human health and the environment.

LECG cites the NRC recommendation on page 43 of their report that EPA should consider ARAR waivers at mining sites:

> The NRC report makes a general recommendation for "mega mining sites, such as the Coeur d'Alene Site as follows: "(b)e ready to waive specific [ARARs] if an effective monitoring program demonstrates that those numeric standards are not necessary to achieve the basic goals of protecting human health and the environment."

EPA agrees with the NRC and does expect to consider ARAR waivers if future conditions warrant such an evaluation. However, the NRC clearly recognizes that ARARs can be waived only if there is an adequate basis. As the NRC indicates for this

[4] 42 U.S.C. § 9621(b)(1) and 40 C.F.R. 300.430(e)
[5] 42 U.S.C. §§ 9621(d); and 40 C.F.R. §§ 300.430(f)(1)(ii)(A), (B) & (C).

site, that would involve implementing the remedial actions and monitoring their effectiveness. If the monitoring information suggests that attaining the numeric standards is technically impracticable, EPA would consider waiving the numeric standard and developing a different cleanup goal that would still be protective of human health and the environment. Thus, the possibility of an ARAR waiver is not a blanket authorization to ignore legally required cleanup standards.

The failure to properly analyze the threshold criteria underlies LECG's comparison of EPA's 2002 Interim Remedy against the ASARCO Alternative. Thus, on page 48, LECG compares the two alternatives using a subset of the balancing criteria, i.e. short-term effectiveness, implementability, and cost:

> The probability assigned to implementing our alternative remedy is further supported by a review of our alternative remedy and the interim ROD remedy against the National Contingency Plan (NCP). As admitted by USEPA in its interim ROD, a review of the balancing criteria of the NCP shows that our alternative remedy is more favorable from the standpoint of short term effectiveness, implementability and cost than USEPA's interim ROD remedy.

Using LECG's method, doing nothing, i.e. the No Action alternative, ranks higher than all other alternatives. Clearly, taking no action would have fewest short-term impacts, would cost less and would be easiest to implement. Indeed, this would be true at almost every hazardous waste site in the country. Thus, LECG's conclusion that the ASARCO Alternative ranks higher than the 2002 Interim Remedy can only be made by ignoring the critical threshold criteria as well as long-term effectiveness. In fact, when EPA evaluated the remedies properly, the ASARCO Alternative ranked second lowest, just above the No Action alternative (ROD 2002).

LECG also ignores the threshold criteria in their treatment of cost. They imply that the overall cost of a remedy dictates whether or not it would be selected. Thus, on page 54 of their report, they state that: "USEPA has rarely, if ever, selected or implemented a ROD remedy whose estimated value cost exceeds $1 billion." There is no limitation in the NCP on the overall cost of a remedy. The NCP cost evaluation criterion is used to compare relative costs of remedies. In fact, EPA currently has sites where the remedy is expected to cost more than $1 billion, such as the Hanford Nuclear Reservation, the Passaic River Project, Fernald Environmental Management Project, and Rocky Flats Site. Cost is highly dependent on the complexity and size of the site. The Coeur d'Alene site is both complex and immense. EPA has selected numerous remedies that are as expensive as this one on a per acre basis.[6]

Another example of LECG's selective use of individual NCP criteria is their treatment of short-term impacts. On page 48 they state:

> The extensive excavation envisioned in the Lower Basin interim ROD remedy has been recognized by NRC as being harmful to the environment and wildlife in the short term.

[6] For example, Stringfellow Superfund Site, Casmalia Resources Superfund Site, Operating Industries Inc. Landfill, Commencement Bay Nearshore/Tideflats Superfund Site.

Almost every cleanup remedy involves adverse short-term impacts. EPA did evaluate the short-term impacts of remedy implementation for this site during the RI/FS. As the NCP requires, EPA considered the short-term impacts along with the other evaluation criteria during its analysis. As discussed in my report of June 15 2007, 80% of the Lower Basin, or 15,200 acres, is toxic to waterfowl. The RI/FS revealed that the impacts to habitat in the short term were outweighed by the long-term benefits. Furthermore, EPA plans to stage Lower Basin cleanup over a 25-year timeframe in order to phase the work such that short-term impacts can be managed. In addition, EPA will work closely, as in the past, with federal, state, and tribal wildlife managers during remedy implementation.

LECG states on page 48 that:

> The interim ROD's evaluation of the alternative remedy [ASARCO Alternative] against the final two balancing criteria of the NCP -- namely long-term effectivenss and reduction of toxicity, mobility, or volume through treatment – incorrectly suggests that our alternative remedy ranks low in comparison to the interim ROD remedy. We conclude that, with respect to these two NCP criteria, USEPA's judgement of our alternative remedy is flawed.

Figure 1 and Figure 2 for the Upper and Lower Basins, respectively provide a comparison of contaminated materials addressed by EPA's Interim Remedy, EPA's Comprehensive Remedy, and the ASARCO Alternative. This comparison highlights the differences between the three cleanup actions with respect to the amount of contaminated material addressed and areas remediated. As can be seen in Figure 1 and Figure 2, EPA's Comprehensive Remedy targets much more of the contaminant sources. Similarly, the 2002 Interim Remedy targets more contaminant sources[7] than the ASARCO Alternative. Therefore, LECG is incorrect when they state that EPA misjudged the long-term effectiveness of their remedy, given the limited actions of the ASARCO Alternative as highlighted in Figures 1 and 2.

LECG again misapplies the remedy selection criteria in their evaluation of the criterion of reduction of toxicity, mobility, and volume through treatment. On page 49 of their report they state: "Further, with respect to reduction of toxicity, mobility, and volume through treatment, our alternative remedy is adequate to reduce mobility of contaminants of concern." LECG fails to point out that the ASARCO Alternative does not include treatment, therefore it cannot comply with this criterion.

LECG misconstrues the position of the State with respect to the Interim Remedy. State acceptance is one of the modifying criteria, along with community acceptance. LECG incorrectly states on page 49 that: "It is not known if the state would concur with the interim remedy because of the financial implications." In fact, the state of Idaho submitted a letter of concurrence for the 2002 Interim Remedy and that letter is included in EPA's Interim ROD (2002 ROD). EPA continues to work closely with Idaho as it implements the Basin remedy.

[7] Thus, LECG's statement on page 30 of their report that "[o]ur alternative remedy is as effective and protective as the interim ROD remedy" is insupportable. As demonstrated in Figures 1 and 2, the ASARCO Alternative is not comparable to EPA's Interim Remedy, let alone the Comprehensive Remedy, in addressing sources of contamination.

Finally, LECG incorrectly states on page 23, that EPA erred in calculating the net present value remedy costs in the RI/FS. Guidance from EPA's Office of Solid Waste and Emergency Response, A Guide to Developing and Documenting Cost Estimates for Feasibility Study (OSWER 9355.0-75) page 4-3 states that:

> Most FS [Feasibility Study] cost analyses begin with simplifying assumption that the duration of initial construction and startup will be less than one year….For FS present value analyses, most capital costs are assumed to occur in year 0.

Therefore, EPA appropriately calculated costs during the FS, following EPA guidance.

In conclusion, as shown above, LECG's analysis of the ASARCO Alternative, as well as their evaluation of EPA's Interim Remedy is based on fundamental errors in the interpretation of the statutory and regulatory requirements for remedy selection. Accordingly, there is no legal or technical basis for LECG's projections of the "probability" that remedial alternatives other than what EPA selected would be substituted at some future point in time. For example, on pages 35 and 42, respectively of their report they present the following probabilities for the Upper and Lower Basin components of the Interim Remedy:

> We assigned a 40% probability to the implementation of USEPA's interim ROD remedy….We assigned a probability of 60% to the eventual adoption of our alternative remedy in the Upper Basin…
>
> We assigned a 30% probability to implementation of USEPA's interim ROD remedy in the Lower Basin…we assigned a 70% probability to implementation of our alternative remedy…

These "probabilities" ignore the fact that the ASARCO Alternative has already been evaluated under the relevant legal and technical standards and was rejected because it ranked so low in protectiveness, compliance with ARARs, and long-term effectiveness. Hence, the appropriate probability to assign to the ASARCO Alternative is zero. EPA has in fact selected the first phase of cleanup remedies for the Basin in the 2002 Interim ROD.

III. NRC Report

As discussed in my report of June 15 2007, the National Research Council of the National Academies (NRC) conducted a review of EPA's 2002 Interim Remedy. This review resulted in a number of recommendations to EPA on how to proceed with cleanup actions in the Basin. The NRC findings are consistent with the approach taken by EPA in the Comprehensive Remedy. LECG asserts that the ASARCO Alternative satisfies most of the NRC recommendations. In fact, the ASARCO Alternative is inconsistent with the NRC report and would not address critical concerns raised by the NRC.

A. The NRC Review

In 2002, the United States Congress instructed the Environmental Protection Agency (EPA) to ask the NRC to conduct an independent evaluation of the Basin as a case study to examine EPA's scientific and technical practices in Superfund, including human and ecological risk assessment, remedial planning, and decision making. The NRC therefore evaluated EPA's scientific approach and decision-making for the 2002 Record of Decision (ROD). In 2005 the NRC issued a report presenting the results of its investigation.

B. NRC Findings and the EPA Comprehensive Remedy

In interpreting the NRC report, it is important to keep in mind that the evaluation was conducted on EPA's 2002 Interim Remedy and not the Comprehensive Remedy which forms the basis for the United States' claim against ASARCO in this case. As EPA stated in the Basin Interim ROD, the Interim Remedy is not a final action since it is not protective of human health and the environment, and therefore cannot be a final cleanup action for the Basin. Rather the Interim Remedy is a prioritized subset of actions from the Comprehensive Remedy. Many of the NRC concerns and recommendations focus on the scope of the Interim Remedy and how EPA selected the subset of cleanup actions.

Indeed, the main criticism of the EPA Interim Remedy was that it did not go far enough in addressing source areas and the substantial risks to the environment. As stated by the NRC:

> The proposed remedies will not lower the amount of surface-water contamination (particularly from dissolved zinc) to levels specified in water-quality standards to protect native fisheries. Nor is it clear that cleaning up only 25% of the basin's wetlands will provide adequate protection to migratory waterfowl. Nineteen of the migratory bird species in the basin are considered to be at risk from the contamination in the basin (EPA 2002, pg 8-2). EPA recognized that its proposed remedies may not fully protect human health and the environment and therefore has designated the selected remedies as interim measures….[8]

The NRC also concluded that:

> What is certain is that, until sources in the upper and middle basins are cleaned up, contaminants will continue to move downstream and mix with the relatively clean but large sediment load from the North Fork Coeur d'Alene River; these collective sediments will deposit in the streambed, stream banks, wetlands, marshes, and lateral lakes of the main stem of the river and eventually settle into Lake Coeur d'Alene.[9]

In fact, the concerns of the NRC on the Interim Remedy are largely addressed by implementation of the Comprehensive Remedy.

1. EPA Compliance with Regulations

The NRC found that EPA followed the applicable regulations during the RI/FS and remedy selection for the Basin. On page 385 of its report, the NRC states:

> EPA's decision-making process regarding remedial actions in OU-3 of the Coeur d'Alene River basin followed the NCP (40 CFR 300), which is applicable to all Superfund sites.

The NRC also states on page 397:

[8] NRC 2005 page 386.
[9] NRC 2005 page 384.

> EPA has followed the procedures and requirements as understood by the committee set forth in the legislation establishing the Superfund program and in the NCP for determining the nature and extent of contamination at National Priorities List sites and for selecting remedies to reduce the risks to human health and the environment resulting from this contamination.

Further, the NRC determined that EPA followed scientific and policy procedures in assessing risks to human health and the environment in the Basin and stated that the ecological risk assessment (ERA) for the Basin was "substantially more extensive than ERAs at many other sites."[10]

Regarding EPA's requirements to coordinate with external parties, the NRC included in its report findings from the EPA Inspector General's evaluation of EPA's work in the Basin:

> A review in March 2004 by the EPA Office of Inspector General Ombudsman found that Region 10 EPA had met and gone beyond requirements for soliciting and including community involvement during the process. Indeed, in the experience of the committee members, the number of cooperating organizations, processes established to provide avenues for citizen participation, and opportunities for the public to obtain information and provide written and verbal input have been substantially greater than what is normal at Superfund sites.[11]

2. Residential Cleanup

The NRC was supportive of EPA's residential cleanup and found that the residential cleanup would be protective of human health:

> It is expected that the cleanup of contaminated soils in yards, recreational facilities, and other sites is expected to be protective of human health…[12]

Addressing contaminated yard soils is appropriate, according to the NRC, for a couple of reasons: children can be exposed to lead through contaminated yard soils and house dust. House dust is comprised of several components, one of which is yard soil.

> The approach described for soil replacement is appropriate because children are exposed to lead in a number of different sources, including drinking water, inhaled and ingested dust and soil, food, paint…[13]

3. Source Control

The NRC determined that EPA adequately identified sources. The NRC report defined source areas in general as "the specific locations of materials that contribute contaminants to environmental media of interest (for example, surface water or groundwater)."[14]
The NRC stated that:

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[10] NRC 2005 page 10.
[11] NRC 2005 page 385.
[12] NRC 2005 page 386.
[13] NRC 2005 page 343.
[14] NRC 2005 page 5.

> Major tailings, waste rock, and floodplain tailings sources of metal contaminants were identified by EPA as to location and area….
>
> The committee believes that the large number of samples collected and analyzed provides information on contaminant locations and trends related to contaminant transport and fate in the basin, especially for surface water. [15]

Specific to the Upper Basin sources, the NRC stated that:

> The main source areas of dissolved metals to the Coeur d'Alene River system are the upper basin (tributary streams feeding the South Fork Coeur d'Alene River) and middle basin (middle reach of the South Fork from Wallace to Cataldo).[16]

Lower Basin sources are described by the NRC:

> The riverbed holds most of the lead in the lower basin….Riverbanks possess a relatively small proportion of the lead that is available for transport in the system.[17]

The NRC further expressed concerns over recontamination if source areas were not addressed:

> It is inevitable that recontamination will occur to some portion or all of what is remediated unless upstream and instream sources are removed and/or stabilized first.[18]

Although the NRC found that EPA had identified contaminant sources in the Basin, it did not believe EPA was aggressive enough in addressing them. The NRC expressed concern over the Interim Remedy's ability to reduce the amount of surface water contamination in the Upper Basin. It also raised concerns about how much protection would be provided to migratory waterfowl in the Lower Basin given the limited cleanup actions included in the Interim Remedy and the potential for recontamination.

These concerns are addressed in the Comprehensive Remedy. The Comprehensive Remedy incorporates the Interim ROD as well as cleanup actions for most of the floodplain sediments, tailings, waste rock piles, and adit drainages in the Upper Basin. These features comprise the main sources of zinc loading to the Upper Basin. It is estimated that at completion of the Comprehensive Remedy, the concentrations of contamination in surface water would be one-third what they are today and improvements would continue as the system stabilizes after construction (RI/FS 2001). In the Lower Basin, cleanup of waterfowl habitat would be conducted on more than 7,000 acres of the area that is above the cleanup level of 530 milligrams per kilogram (mg/kg). In addition to these cleanup actions, EPA proposes returning some clean agricultural lands in the Lower Basin to wetlands, and thereby creating additional clean waterfowl habitat (ROD 2002). Recontamination concerns would also be

[15] NRC 2005 page 116.
[16] NRC 2005 page 350.
[17] NRC 2005 page 401.
[18] NRC 2005 page 381.

addressed through implementation of the Comprehensive Remedy since most contaminants in the Basin would be removed, treated or contained.

As mentioned earlier, Figure 1 and Figure 2 provide a comparison of contaminated materials addressed by EPA's Interim Remedy, EPA's Comprehensive Remedy, and the ASARCO Alternative. As can be seen in Figure 1 and Figure 2, EPA's Comprehensive Remedy targets much more of the contaminant sources. Similarly, the 2002 Interim Remedy targets more contaminant sources[19] than the ASARCO Alternative. Therefore, the Comprehensive Remedy is more responsive to the NRC's concern that: "..contamination problems in the study area will be solved only when the contaminated materials in the river basin have been removed or stabilized."[20]

4. Groundwater

The NRC emphasized that groundwater is a significant source of dissolved metals to the system and because of this, criticized EPA's Interim Remedy for not including groundwater treatment. Specifically, the NRC stated that:

> …EPA's site characterization provided a useful depiction of the metal concentrations in soils, sediments, and surface water over the large spatial scale in the basin. However, the characterization did not adequately address groundwater – the primary source of dissolved metals in surface water – or identify specific locations and materials contributing metals to groundwater. [21]
> …it is virtually impossible for EPA to achieve the water-quality standard by the remedy proposed in the ROD, because it does not address groundwater, which is the largest source of zinc loading to the river.[22]

EPA's Comprehensive Remedy includes the excavation and disposal of approximately 8 million cubic yards of waste from the Upper Basin. From the Lower Basin, the Comprehensive Remedy identifies dredging and disposal of 21 million cubic yards of contaminated riverbed material and 1.8 million cubic yards of contaminated riverbank. In some locations within the Basin, large waste impoundments will not be excavated with EPA's Comprehensive Remedy. However, these areas will be hydraulically isolated from the watershed through construction of subsurface containment walls and installation of associated groundwater collection and treatment systems. These hydraulic isolation actions will address many of the contaminated groundwater areas in the Basin.

The NRC also expressed the concern that division of the site into operable units could impair EPA's ability to address contamination in the Basin from a continuous watershed, or system, approach.[23] This NRC concern is largely the result of its focus on

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[19] Thus, LECG's statement on page 30 of their report that "[o]ur alternative remedy is as effective and protective as the interim ROD remedy" is unsupportable. As demonstrated in Figures 1 and 2, the ASARCO Alternative is not comparable to EPA's Interim Remedy, let alone the Comprehensive Remedy, in addressing sources of contamination.
[20] NRC 2005 page 11.
[21] NRC 2005 page 2.
[22] NRC 2005 page 363.
[23] NRC 2005 page 5.

the Interim Remedy, which did not include the Box. In fact, EPA has always taken the Box into account when evaluating the Basin. The division of operable units is an artifact of the history of the site. EPA began its work in the Box in response to a health crisis caused by lead poisoning in children. As the NRC recognized, dividing sites into operable units is necessary at certain sites:

> In some cases, defining separate OUs [operable units] may facilitate an earlier start on cleanup of a more-contaminated area. This was the situation for OU-1 and OU-2 [Box]….[24]

In addition to the focus on human health, EPA recognized that surface water and groundwater within the Box are major contributors of dissolved zinc to the Basin. The NRC similarly raised a concern about the contribution of Box contaminants to the watershed and stated:

> …the committee is concerned that the agency has not identified any alternatives addressing the primary source of dissolved zinc loadings to the middle basin—groundwater discharges in the box…

To date, EPA has spent more than $350 million dollars designing and implementing cleanup actions within the former mining and metallurgical facility. Most of those cleanup actions included excavating and disposing of waste materials that were contaminating surface water and groundwater in the area. EPA will take additional actions within the Box that are necessary to protect human health and the environment and comply with ARARs. Therefore, EPA has been monitoring the Box and the completed cleanup actions and has integrated this monitoring program with the Basin. Future cleanup actions within the Basin will be conducted after considering data gathered from the whole watershed. EPA believes this is consistent with the NRC recommendations.

5. Adaptive Management

The NRC was highly supportive of using an adaptive management approach when cleaning up the Basin.[25] The environmental monitoring programs that EPA has implemented, such as sampling of surface water, groundwater, soil, sediment and wildlife, are integrated for evaluation. EPA is monitoring the effectiveness of the many cleanup actions it is conducting in the Box and will use this data to inform future cleanup activities in the Box and Basin. In addition to collecting environmental data on a routine basis, EPA has identified a 40-year implementation plan for completing the Comprehensive Remedy. This staged 40-year implementation will enable EPA to thoroughly evaluate the monitoring data in order to make appropriate adjustments to the cleanup strategy. This approach is consistent with the NRC recommendation that EPA use adaptive management in conducting cleanup actions within the Basin.

While the complexity and size of the site require a flexible, adaptable approach to cleanup, this does not mean that reasonable projections cannot be made of the types of

[24] NRC 2005 page 112.
[25] NRC 2005 page 361.

cleanup needed to meet statutory or regulatory requirements. In the RI/FS, EPA was able to comprehensively develop alternatives and assess their effectiveness. EPA recognized, however, that implementation of this cleanup action would need to be phased and therefore the Interim ROD selected a subset of prioritized actions from the Comprehensive Remedy. LECG erroneously cites the 2002 Interim ROD on page 29 of their report where they state that:

> Also according to USEPA:
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> > Prediction of the environmental situation 30 years into the future is impossible given the unknowns about the effectiveness of remedial actions and natural attenuation [emphasis added by LECG].

This section of the 2002 Interim ROD is describing concerns of the State of Idaho, not EPA.

6. Additional Modeling of Source Areas

The NRC generally stated that the probabilistic tool used by EPA during the RI/FS was useful in identifying sources of contamination in the Basin. However, they recommended that EPA develop a more robust model to evaluate the effectiveness of cleanup actions.[26] Since the NRC published their report, EPA has been looking closely at their recommendations and additional efforts have been taken to refine and develop a model to be used to evaluate the effectiveness of cleanup actions. In addition to that, during design of the lower Canyon Creek component of the Interim Remedy, EPA used a three-dimensional groundwater model to evaluate the watershed. That model has been used to quantify the amount of zinc coming from discreet source areas of the Canyon Creek drainage and evaluate the impacts of taking cleanup actions on those source areas (CH2MHill 2007). Among other things, the model confirms that excavation and removal actions are far more effective in reducing contaminant load than stabilizing the waste in place.

7. Repositories

The NRC recommended excavation and disposal of contaminated materials in the Basin and stated:

> The process of excavating contaminated sols and disposing of them in a secure landfill has been demonstrated at many Superfund sites.[27]

The committee expressed concern about the lack of repository locations that had been identified to handle the excavated materials:

> The lack of repositories for contaminated soils and sediments is particularly problematic and is a primary concern to the committee…[28]

[26] NRC 2005 page 404.
[27] NRC 2005 page 392.
[28] NRC 2005 page 398.

Since the 2002 Interim ROD and the NRC report came out in 2005, EPA has continued to conduct work within the Basin. Part of that work has involved the siting and construction of additional disposal locations for handling the contaminated materials that are generated during implementation of cleanup actions. Specifically, EPA has developed a repository in the Big Creek drainage, is working with the State of Idaho and the mining companies to expand the Page repository within the Box, and is continuing to look for other locations. A project team comprised of representatives from federal, state, local government, industry, and private citizens have been working together to identify these repositories and future disposal locations.

8. Cleanup Goals

The NRC also stated concerns with cleanup levels developed in the RI/FS for ecological protection:

> There appear to be insufficient data to assess what levels of particulate lead affect songbirds, small mammals, and riparian plants, and what, if any, benefit would be observed when the streambanks are remediated.[29]

Since the Interim ROD was signed in 2002, EPA has been working with the United States Fish and Wildlife, the State of Idaho, the Coeur d'Alene Tribe and other interested parties in developing cleanup levels that would be protective of songbirds in the Basin. After gathering data and analyzing the effects of contamination to this subpopulation, the team has preliminarily identified a range of contaminant concentrations that could be protective of songbirds. That range includes 530 mg/kg, which is the cleanup goal identified in the Interim ROD for protection of waterfowl. Therefore, it is likely that the targeted cleanup goal for excavation in the Lower Basin of 530 mg/kg will be protective of both waterfowl and songbirds (USFWS 2007).

In conclusion, the NRC report does not represent a criticism of the Comprehensive Remedy, rather it reflects a concern of the NRC that EPA is not implementing a final cleanup quickly enough.

C. NRC Findings and the ASARCO Alternative

As discussed above, the critical concerns of the NRC are: (1) that contaminant sources within the Basin need to be characterized and addressed (2) that contaminated groundwater must be remediated, (3) adaptive management should be used to develop effective cleanup strategies in the long term, (4) greater attention is needed in siting and constructing repositories to handle excavated waste materials, and (5) additional cleanup goals should be identified to protect additional ecological receptors.[30] The ASARCO Alternative addresses none of these concerns.

1. Source Control

[29] NRC 2005 page 377.

[30] The NRC also endorsed EPA's residential cleanup action. ASARCO also agrees with this remedy on page 4 of their report.

The NRC emphasized the need to address sources of contamination in the Basin:

> What is certain is that, until sources in the upper and middle basins are cleaned up, contaminants will continue to move downstream and mix with the relatively clean but large sediment load from the North Fork Coeur d'Alene River; these collective sediments will deposit in the streambed, stream banks, wetlands, marshes, and lateral lakes of the main stem of the river and eventually settle into Lake Coeur d'Alene.[31]

> The riverbed holds most of the lead in the lower basin….Riverbanks possess a relatively small proportion of the lead that is available for transport in the system.[32]

LECG acknowledges this concern on page 4 of their report:

> Specifically, we conclude that the Upper Basin of OU-3 is best addressed using a source control approach to reduce the amount of dissolved metals in rivers and streams. We conclude that conditions in the Lower Basin can be best addressed using a combination of removal of tailings lenses and bank stabilization. This remedial strategy is consistent with the recommendations of the National Resource Council….

Yet the ASARCO Alternative does little to identify sources and leaves most of the contamination in the Basin untouched.

While LECG characterizes the ASARCO Alternative as a "source control strategy[33]" it is obvious that their definition of source control is very different from the NCP and the NRC. Source control actions are construction activities that are taken to prevent the release of hazardous substances from a source into the environment (40 CFR 300.5). Source control can include such measures as excavation and removal, stabilization, capping, collection and treatment, and hydraulic isolation. The key is to control releases of hazardous substances into the environment. Thus, any of the actions listed above can be an element of a source control program if it is determined that it is effectively preventing the release of hazardous substances from a source to the environment. On the other hand, if the actions listed above do not prevent the release of hazardous substances, they do not represent source control.

The ASARCO Alternative does not effectively control the sources of contamination in the Basin and therefore, contrary to LECG's assertions, is not a source control remedy. Most significantly, the ASARCO Alternative includes no cleanup actions for most of the source areas in the Upper Basin and no cleanup action for the Lower Basin riverbed sediments. In fact, as demonstrated in Figure 1 and Figure 2 of this report, the ASARCO Alternative addresses only a tiny fraction of the contaminant sources in the Upper and Lower Basin. As can be seen in Figure 1 for the Upper Basin, it involves little contaminant removal and disposal in repositories. As reflected in Figure 2, it does not address the largest source of particulate lead in the Lower Basin: the riverbed sediments. Rather, ASARCO's approach seeks to stabilize riverbanks with engineered controls.

The severely limited scope of the ASARCO Alternative is also reflected in its treatment

[31] NRC 2005 page 384.
[32] NRC 2005 page 401.
[33] LECG Report page 37.

of contaminated wetland habitat in the Lower Basin. More than 15,000 acres of the 19,000 acre Lower Basin wetland habitat is lethal to waterfowl. The ASARCO Alternative does not propose cleaning up contaminated waterfowl habitat, rather it focuses on "habitat shifting." Habitat shifting involves discouraging use of the contaminated areas by scaring the birds away with noisemakers and other activities. ASARCO proposes converting 1,600 acres of relatively clean land in the Lower Basin to clean waterfowl habitat and encouraging the use of these areas by waterfowl. The amount of clean habitat created is completely inadequate when compared to the extensive acreage that will remain too contaminated for safe waterfowl feeding. Further, the effectiveness of habitat shifting is not known. The problem is compounded by the fact that ASARCO does not include future funding in its proposal to cover any additional costs that may be needed if its approach does not work.

For those areas that the ASARCO Alternative appears to address, no effort has been made to characterize sources of contamination or evaluate the effectiveness of the proposed remedial actions. For example, on page 36, LECG acknowledges the primary concern of the NRC to characterize contaminant sources:

> …the NRC recommends that "specific sources contributing zinc to groundwater (and subsequently to surface water) and the largest, potentially mobile sources of lead-contaminated sediments be ascertained, and priorities set for their cleanup"

LECG asserts that "*This is the strategy which underlies our alternative remedy.*"
In reality, no data collection or modeling effort was undertaken in developing the ASARCO Alternative. No assessment of contaminant source loading to groundwater or surface water was conducted. Characterization of source areas is clearly not the strategy that underlies the ASARCO approach.

Another example is ASARCO's remedy for the Upper Basin. Mr. Werner, who developed the ASARCO Alternative, states that the ASARCO Alternative focuses on:

> isolating source materials from erosion and minimizing the potential for contact with surface and groundwaters that could result in leaching of metals…..The types of actions have been prioritized based on the potential for a given source to contribute metals to surface or groundwater."[34]

However, there is no modeling or analysis of Upper Basin source areas in Mr. Werner's report so it is unclear how he developed these limited cleanup actions.

Thus, even though LECG characterizes the ASARCO Alternative a source control remedy consistent with the NRC recommendations, it is clear that it is not source control. It targets the least number of contaminant sources as compared to all other cleanup alternatives evaluated through the Basin RI/FS (RI/FS 2001). It fails to adequately characterize contaminant sources in the Upper Basin and does little to address the massive contamination in the Lower Basin. In another section of LECG's report, they more accurately describe the ASARCO Alternative as a *containment system* [emphasis added] on page 49 where they state:

[34] Mr. Werner Report page 2-3.

> Factors to be considered when evaluating long-term effectiveness include the "adequacy and reliability of controls such as containment systems and institutional controls that are necessary to manage treatment residuals and untreated waste.
> Given this directive in the NCP, our source control alternative remedy is more than an adequate *containment system* [emphasis added]…

ASARCO did not attempt any assessment of the effectiveness of their limited containment remedy.[35] Therefore, there is no basis for its conclusion that no additional cleanup actions will be needed after completion of its approach. Consequently, there is no basis for the statement on page 30 that:

> Our alternative remedy is as effective and protective as the interim ROD remedy. We do not expect that additional actions will be required at the end of the 30-year period for either the USEPA's remedy or our alternate remedy.

By contrast, EPA evaluated all of the alternatives as to their ability to improve water quality in the Basin during the Basin RI/FS. Implementing EPA's Comprehensive Remedy would reduce contaminant loading in Upper Basin surface water by 62% at remedy completion. Implementing the ASARCO Alternative would reduce contaminant loading in the Upper Basin by only 8% at remedy completion (RI/FS 2001).

The ASARCO Alternative relies on stabilization and containment actions that have been demonstrated by EPA to be insufficient in addressing Basin contamination. Therefore, the ASARCO Alternative does not embody the recommendations of the NRC that:

> …contamination problems in the study area will be solved only when the contaminated materials in the river basin have been removed or stabilized.[36]

Regarding remedy implementation, LECG suggests on page 35 that:

> *Upstream to downstream source control is standard engineering practice and reflects common sense*….According to the NRC, "source removal or stabilization of sources is fundamental to any remediation effort."

This is consistent with EPA's approach in the Comprehensive Remedy. The upstream to downstream approach will minimize recontamination. LECG suggests that the ASARCO Alternative would also proceed upstream to downstream, but the ASARCO Alternative does not address most contaminated materials. Therefore, the sequencing of cleanup actions is irrelevant because so few source areas are being addressed and recontamination will remain a concern.

2. Groundwater

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[35] Ironically, LECG cites the NRC reports recommendation that EPA conduct more extensive modeling of remedial actions on page 32 of their report. As noted previously, EPA is evaluating additional modeling tools and has conducted additional modeling of the Canyon Creek drainage. By contrast, the ASARCO Alternative has no quantitative modeling whatsoever.

[36] NRC 2005 page 386.

Citing the NRC report, LECG criticizes EPA's Interim Remedy for not including groundwater cleanup actions. For example, LECG states on page 35:

> The threat to aquatic life in the basin results largely from the influx of high levels of dissolved zinc from groundwater to surface water. And yet *groundwater* has not been targeted for remediation. *Removing contaminated materials to reduce the influx of metals to groundwater is a logical remediation strategy, and is expressly recommended by the NRC in its report.*

On page 36 LECG states:

> NRC pointed out that it is "virtually impossible for EPA to achieve the water-quality standard by the remedy proposed in the ROD, because it does not address groundwater, which is the largest source of zinc loading to the river…."

As noted above, the NRC report evaluated the Interim Remedy which did not have an extensive groundwater treatment strategy. The Comprehensive Remedy does address contaminated groundwater and includes collection and treatment in high priority source areas.

LECG's emphasis on groundwater is ironic because he neglects to mention that the ASARCO Alternative included no analysis of groundwater contamination and includes no groundwater treatment actions. In this respect, the ASARCO Alternative is in stark contrast with the recommendations of the NRC that LECG included in their report.

3. Adaptive Management

As noted above, the NRC generally supported the use of adaptive management principles in EPA's approach toward cleaning up the Basin, although several recommendations were provided for how these principles should be implemented. The ASARCO Alternative is inconsistent with principles of adaptive management. Among other things, adaptive management requires identifying cleanup goals and monitoring to determine whether the cleanup actions will meet those goals. This monitoring information is then used to make changes to the cleanup approach that may be more effective in achieving the cleanup goals.

The ASARCO Alternative includes none of these adaptive management principles and does not take an adaptive management approach, as recommended by the NRC. On page 22 of their report LECG recognizes that:

> USEPA's issuance of an Interim ROD for the CDA Basin is indicative of the unusual nature of the Site—specifically the uncertainty regarding appropriate response actions and the impacts these actions may have.

Although LECG acknowledges the uncertainty in the remedial actions for the site, nevertheless he maintains that their complete cleanup plan could be implemented in 5 years.[37] This remedy implementation schedule does not incorporate enough time to evaluate the effectiveness of their remedial approach, much less to develop additional cleanup approaches if

[37] On page 35 of LECG, the Upper Basin component of the ASARCO Alternative is stated to take 3 years to implement. On page 42 of LECG, the Lower Basin component of the ASARCO Alternative is stated to take 2 years to implement.

the initial actions are ineffective. Indeed, LECG concludes that no additional cleanup actions will be required after implementing the ASARCO Alternative. Specifically, LECG states on page 30 that:

> Our alternative remedy [ASARCO Alternative] is as effective and protective as the interim ROD remedy. We do not expect that additional actions will be required at the end of the 30-year period for either USEPA's remedy or our alternative.

Similarly, on page 55, LECG includes in their final analysis:

> Should additional action be required, we conclude that the scope of the remedy would most likely include additional containment and stabilization of additional source areas, and limited removal and disposal.

Not only is there no technical justification for these statements, they are wholly inconsistent with the principles of adaptive management. Furthermore, predetermining the extent of future cleanup actions is inconsistent with an adaptive management approach and the complete absence of cleanup goals makes it impossible to incorporate adaptive management during implementation of cleanup actions.

4. Repositories

LECG criticizes EPA for not siting adequate repository space in the Basin to accommodate the volume of material that will be generated during implementation of EPA's cleanup action. As noted above, one of the NRC recommendations encourages EPA to expedite siting of repositories. In contrast, the ASARCO Alternative includes no repositories at all. This is likely due to the fact that the ASARCO Alternative involves so little excavation, and disposal in repositories, as depicted in Figure 1 and Figure 2.

The lack of repositories in the ASARCO Alternative is particularly striking because LECG states that ASARCO agrees with the human health component of EPA's remedy.[38] The human health remedy involves excavating contamination from residential yards within the Basin and disposing of this material in repositories. Therefore, the ASARCO Alternative will require repositories. Although the ASARCO Alternative does not include repositories, ASARCO owns several properties within the Basin that could be developed into disposal sites. Many of these properties are located in convenient locations in the Upper and Lower Basins. Providing these locations for disposal would be useful for the human health remedy as well as EPA's Comprehensive Remedy.

5. Cleanup Goals

The NRC advocated developing cleanup goals for a wider range of species than were identified in the 2002 Interim ROD. Conversely, the ASARCO Alternative has no numeric cleanup goals whatsoever. The report upon which the ASARCO Alternative is based, specifically states that the cleanup approach "does not aim unrealistically at numerical criteria such as water quality criteria…"[39] In fact, no cleanup goals for soil, sediment, surface water, or

[38] LECG Report page 4, 7 and 28.
[39] Werner Report, page 1-11.

groundwater are included in the ASARCO Alternative. Clearly, this would not satisfy the concern raised by the NRC.

In summary, it is difficult to understand how LECG can repeatedly state that the ASARCO Alternative is consistent with the NRC recommendations. For example, LECG states on page 30:

> …our alternative remedy, which is fairly captured in the 2004 report of Seven Werner, and is consistent with the recommendations of the NRC.

Clearly, the ASARCO Alternative does not address most of the NRC concerns. The ASARCO Alternative was not developed following CERCLA and did not include an investigation comparable to an RI/FS. It does not target most contamination in the Basin, does not include cleanup goals that are protective of human health and the environment, and does not propose cleanup approaches to meet them.

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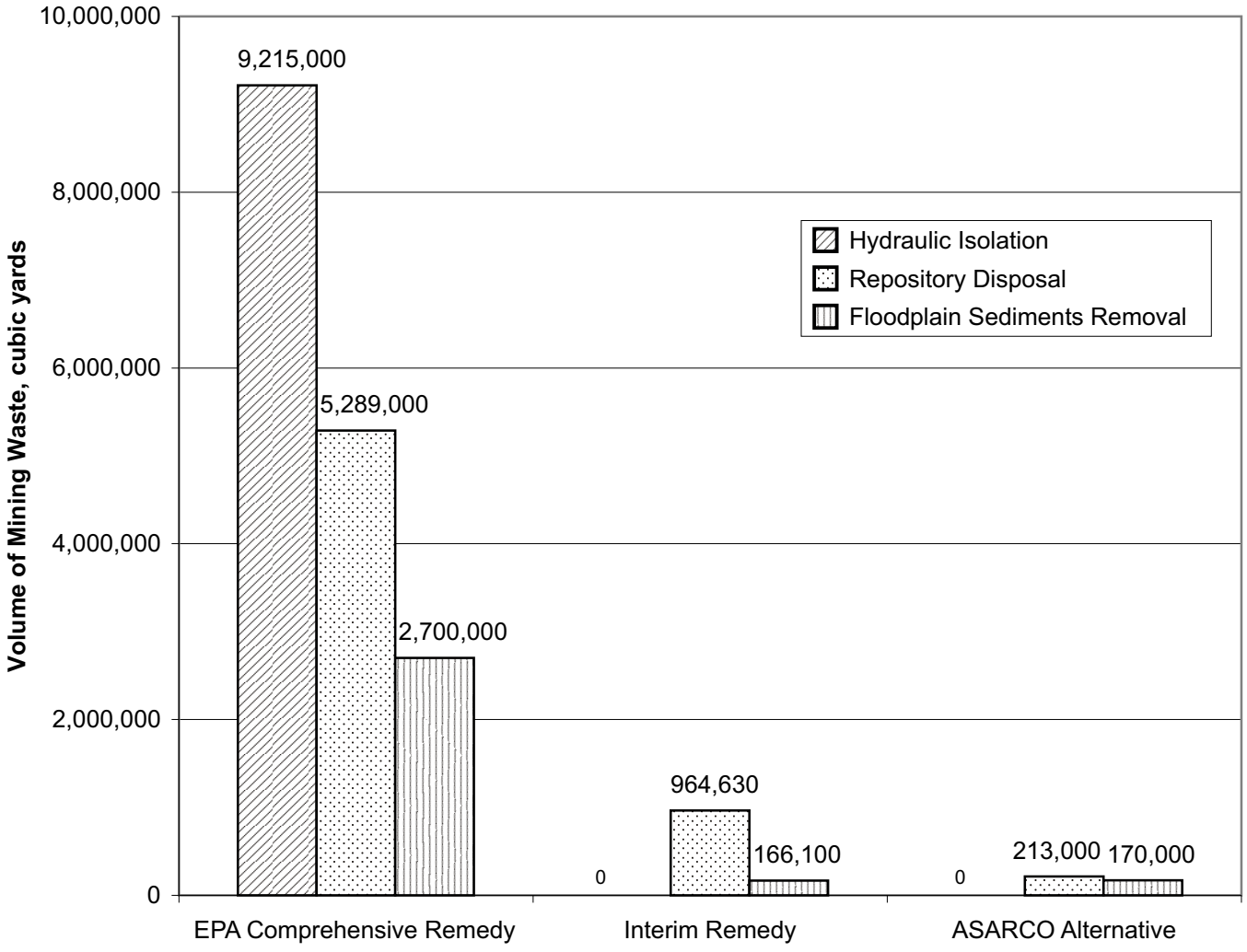
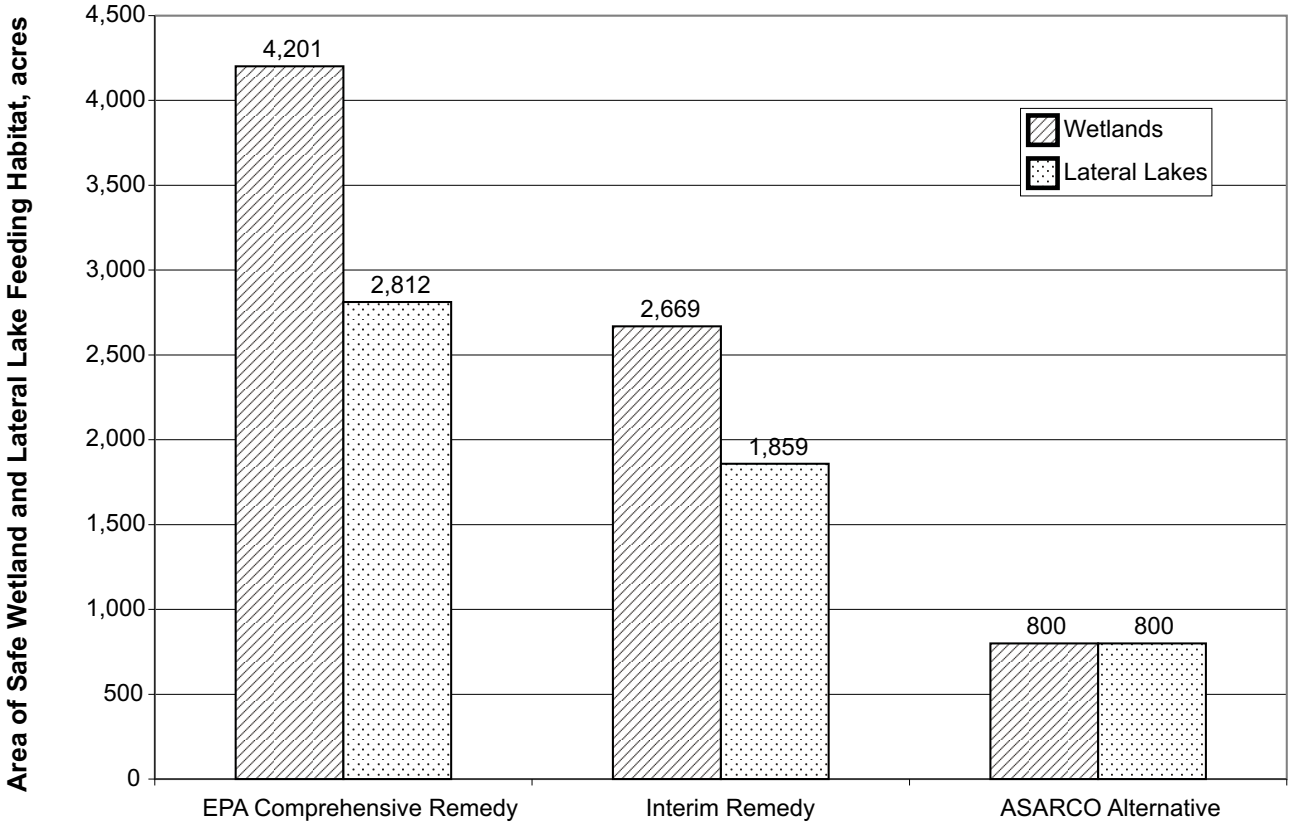


Figure 1. Comparison of EPA Comprehensive Remedy, Interim Remedy, and ASARCO Alternative, Upper Basin



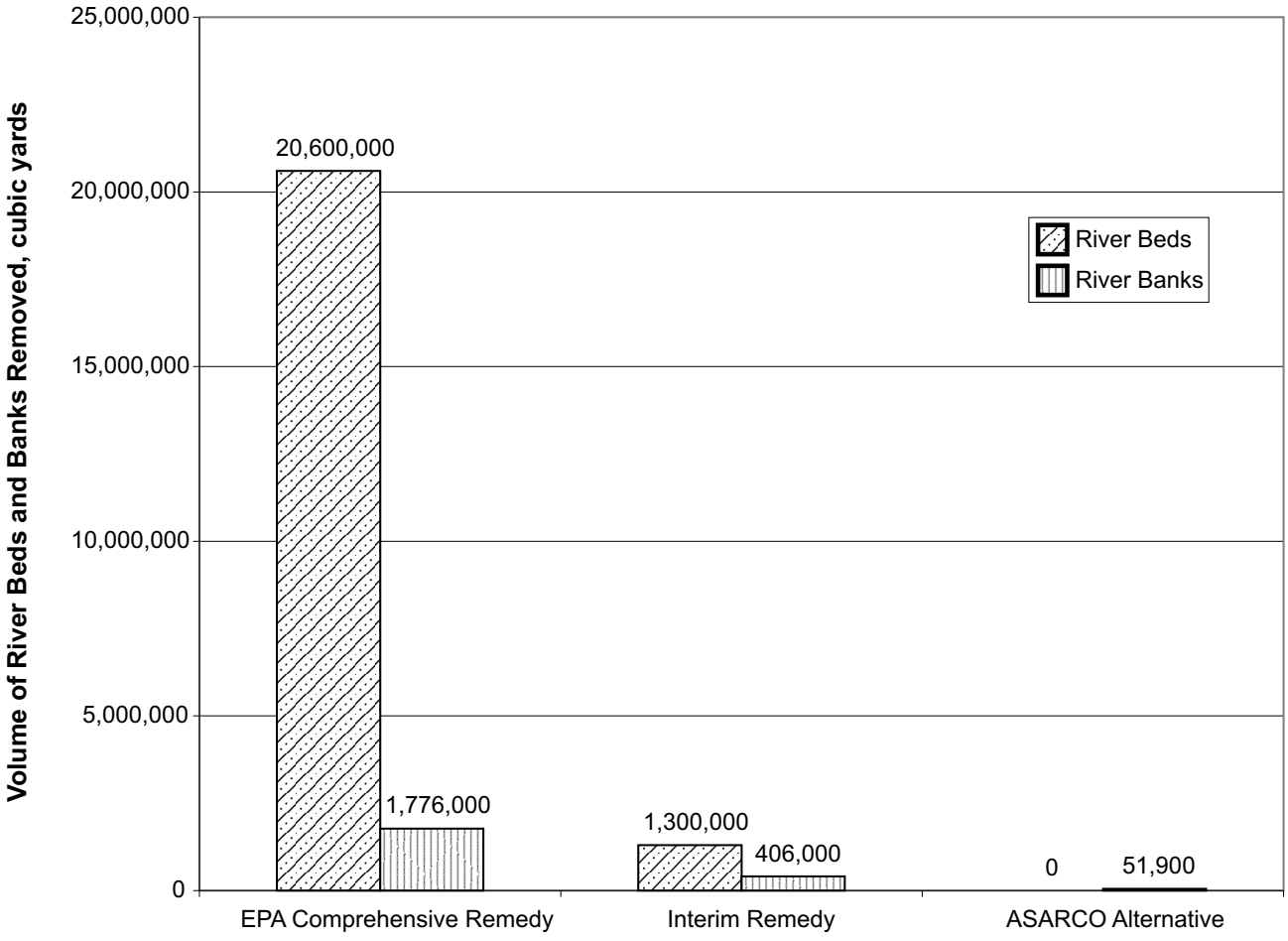


Figure 2. Comparison of EPA Comprehensive Remedy, Interim Remedy, and ASARCO Alternative, Lower Basin